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Example-based fractured appearance

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A common weathering effect is the appearance of cracks due to material fractures. Previous exemplar-based aging and weathering methods have either reused images or sought to replicate observed patterns exactly. We introduce a new approach to exemplar-based modeling that creates weathered patterns on synthetic objects by matching the statistics of fracture patterns in a photograph. We present a user study to determine which statistics are correlated to visual similarity and how they are perceived by the user. We then describe a revised physically-based fracture model capable of producing a wide range of crack patterns at interactive rates. We demonstrate how a Bayesian optimization method can determine the parameters of this model so it can produce a pattern with the same key statistics as an exemplar. Finally, we present results using our approach and various exemplars to produce a variety of fracture effects in synthetic renderings of complex environments. The speed of the fracture simulation allows interactive previews of the fractured results and its application on large scale environments.

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